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A Novel Project for a Public Park.

THE Park Commissioners of the City of Buffalo, in this State, having been asked by the Common Council to consider the practicability of forming a park upon a given site south of the town, have obtained the opinion of Messrs. F. L. and J. C. Olmsted, landscape-architects, upon the question. This opinion, in the form of a pamphlet illustrated with small sketches and accompanied by a plan, gives a definite and remarkably original and interesting form to the project.

It is needless here to summarize the reasons given by the authors why Buffalo should have another park, or why the site in question should be selected. As they show, it is an extremely discouraging spot, from the ordinary landscape-gardening point of view, but it has certain distinctive advantages, and it seems to be proved that there is no better site available, and that a way to adapt this one can be found which will make it both useful and attractive.

The site borders upon Lake Erie and the unobstructed view of the water which it will offer is, of course, a fact of almost priceless value in its favor. It can be reached from the heart of the city by navigable water and by four lines of railroad already in operation. No buildings or cultivated grounds of importance exist to make its acquisition costly, nor is it fitted for agricultural use. But, on the other hand, the surface is quite flat over nine-tenths of its area, and shows no rocks, trees or other valuable natural features. It lies but little above the surface of the lake, and is, consequently, half-swampy and liable to be submerged at seasons of high water. The gravel beach and low shifting sand dunes that edge the lake rest upon a stratum of black muck, which is constantly washed out, and thus the shore is rapidly wasting. And no facility for the landing of visitors from boats is supplied by nature.

Turning now to the plan, which we reproduce on page 463, we find that it is proposed not merely to conquer the natural disadvantages of the site, but actually to base the scheme upon them. The main tract, lying between the shore and the railroads already referred to, is about 240 acres in extent, and nine-tenths of it lies below the level of the lake at high water stages. At its western extremity, however, along the lake, there is a considerable piece of ground which lies several feet higher, and another high strip runs along its southern boundary, while the railroad embankment protects it on the east. Thus it can be flooded only from the northern and from a small portion of the

western side. Here it is proposed that it shall be protected by a levee four and one-half feet high, along which, on the northern side, a tree-planted street may be carried.

The high tract towards the west is to be planted as a green, forming a park-like expanse of turf, about twenty acres in extent, with groups of trees about it. This will afford an excellent playground, and near by will be an athletic ground, with running tracks and other facilities for exercise, three acres in extent. A road for general traffic will cross the park from north to south between the green and the athletic ground, and it will be encircled by drive-ways, with ample spaces for the congregation of persons on foot and in vehicles where the roads approach Lake Erie.

The remainder of the tract in question, about 120 acres of flat and swampy land, is to be turned into a lake with very irregular borders, dotted with islands and promontories. To effect this, it will suffice that the ground shall be excavated in certain places and the soil taken from these heaped upon the remaining portions, while water from Cazenovia Creek is drawn into the excavations, flooding them to the desired height and then passing out into Lake Erie, thus insuring perpetual renewal and freshness. The largest island will be connected with the shore near the north-east corner of the park by a little foot-bridge and is intended to be used for picnics. Its surface will be four or five feet above the water level and planted with shade trees surrounding open spaces of turf. Three smaller islands, which can only be approached by boats, will be reserved as picnic-grounds for private parties who may wish to hire them. And upon still smaller ones it is proposed to breed aquatic birds and grow interesting plants, their shores being protected from disturbance by spaces of shallow water.

Of course, all this implies a park where boats will be the chief means of conveyance. But, as the report explains, this fact by no means militates against the wisdom of the project, for, in all cases where similar schemes have been adopted, their success is emphatic. At Stockholm, for example, and in our own country, at Detroit, there are parks accessible only by boats, yet they are quite as generally used and approved of, as any which have a more usual character. In the case of the Buffalo park ample facilities for walking and driving are provided, but it is believed that its boating facilities may prove its greatest

attraction. To secure these it is proposed to build an artificial haven on the shore of Lake Erie—two parallel piers extending outward to a point on the lake, where at low water a depth of seven feet exists. It is expected that the existence of these piers will cause a sand-bank to form on their southern side, and, supplemented, perhaps, by a wall, will protect the shore from further wasting. In this case, a good beach for surf bathing will be secured, and, on its inward side, facilities for still-water bathing in the artificial lake can be provided. The piers will admit of the approach of steamers of sufficient size coming from the city, and the passengers they land can thence make the circuit of the park on foot or in carriages or by means of boats. For the latter purpose it is intended that row-boats shall be provided, and also public packet boats, in the shape of steam or naphtha launches, which will successively make the tour of the lake, landing passengers where desired. This tour, owing to the winding nature of the water-passages, will be nearly four miles in length.

On the eastward side of the railroad tracks it is thought that, should the state authorities agree, a rifle-range may well be established. A new one is needed in the vicinity of the town, and its association with the park would be a great advantage to those who would use it. In the winter the range could be flooded for skating, and toboggan shutes put up near by, while there is ample room beyond it for all the accessory buildings that would be required.

Thus the proposed park would be not merely a pleasant resort, but a great and varied public playground, including many features which we have no space to note. The extraordinarily skillful way in which, in other works, Mr. F. L. Olmsted has united usefulness and beauty, is one of his highest and most peculiar titles to respect as a landscape-architect; but his talent in this direction has never been more clearly displayed than in the present scheme. It seems as though no out-door amusement in which modern youths and men indulge had been forgotten; yet all are provided for without injuring the beautiful effect which such a park ought to have. Nothing could be prettier

than the effect we may predict for this scheme, if it is as well carried out as it is now sketched on paper. The greatest variety in outline, disposition and planting will be aimed at in the arrangement on the main shore and the many islands. Each rod of the four-mile water journey will reveal new combinations of water, land and foliage, while the views from the green, with the varied scene to the eastward and the broad expanse of Lake Erie to the westward, will be of unusual charm.

Of course the beauty of the intended result would not fully reveal inself at once, for time must be allowed for trees to grow where to-day there are none. But how much intelligent planting can accomplish in a very few years, we showed not long ago when we illustrated a portion of the park that Mr. Cleveland recently designed for Minneapolis, and in all such schemes ultimate excellence rather than immediate effect is naturally the prime consideration. Of course, too, this would be a costly scheme to execute; but its projectors show that it would not be too costly for the consideration of wise city-fathers, either as regards the expense of actual construction or the future annual expense of maintenance. From the artistic point of view the idea is one that we cannot help desiring may be put in execution; for its intrinsic interest is great, and an idea of just the same kind has never before been carried out by a landscape-architect. And, from the material point of view, there ought, in a city like Buffalo, to be no serious objections made.

In a separate report the Messrs. Olmsted discuss the question of the driving approaches to the proposed South Park; but as the subject could be clearly understood only by those familiar with Buffalo, it does not seem advisable to refer to it here. Our illustrations presenting views in the proposed park as well as the plan, are reproduced from the Messrs. Olmsted's report, and they serve to show how attractive a park of this character might be made.

The manufacture of the oil of sassafras is becoming an important industry in some parts of the country, especially in the Southern States, where this tree is common. Only the roots are used; they are chopped up into small pieces by a machine constructed for the purpose, the oil being then distilled from the chips by the aid of steam. About one gallon of the oil, weighing nine pounds, is obtained from 1,000 pounds of the chips. The uses for which the oil of sassafras can be employed are numerous and varied. It is a favorite perfume for soaps and candies; it is used as a solvent for different gums, and as a liniment. It is also very largely employed in the manufacture of several popular proprietary medicines. The importance of this industry may be expected to increase rather than diminish, as the Sassafras and the Persimmon are the two trees which are spreading most rapidly over the old and abandoned fields throughout the Southern States outside of the Pine Belt proper; and at present prices good wages can be made by digging out the roots.

Double Stocks.

MANY are the theories that have been promulgated as to the cause of the production of double flowers, but few indeed have been the practical experiments made with a view either to confirm or confute the assumptions that have been so freely made. But now we find a record in the *Journal of the National Horticultural Society of France* which bears so directly on the point, that we shall be doing our readers a service by calling attention to it. The record is taken from one of the reports of the German agricultural stations—institutions practically unknown here. The report in question bears the name of Dr. Nobbe—a sufficient guarantee of the credit that may be assigned to the experiments.

At the outset the point is clearly raised by the inquiry as to the reason why seeds of herbaceous plants, improved by cultivation, show a tendency to produce double flowers? Is there any appreciable relation between the nature and condition of the seed and of the flowers which result from their development? In the horticultural department of the experimental station at Tharaud an attempt has been made to find an answer to these queries. For this purpose the common stock was selected, as completing its development in the course of one season. Twelve distinct varieties were selected from the establishment of M. E. Benary, of Erfurt. Of each of the twelve varieties 100 seeds, as nearly alike as possible, were chosen. These seeds were placed in Dr. Nobbe's germinating apparatus, and submitted to a continuous and uniform temperature of 20° C. (= 68° F.). After four days some of the seedlings (which must have germinated at once) were removed from the apparatus, and placed in the open ground. The other seedlings, which came up after four days, and between four and nine days after the commencement of the experiment, were thrown away, so that the seedlings reserved consisted of two classes—one in which the germination had been accomplished within four days, and the other those in which germination was not appreciably commenced till after the ninth day. We need not give in detail the arrangement for the accurate comparison of the two sets of seedlings—suffice it to say that the seedlings were eventually transferred to large pots, and placed side by side, half of the pot being occupied by those of slow growth, the second half by the quickly developed seedlings. Moreover, some of the two sets of seedlings were placed in large, others in small pots; some in sterile, sandy soil, others in rich soil, care being always taken to make the experiments rigidly comparable. In all, nearly 600 seedlings were thus under observation. In each case the time of the first appearance of the flower-bud was duly noted, and the period when the first flower opened,

From the large mass of statistical details so obtained the general result was arrived at, that for each variety the period of time between the sowing and the appearance of the first flower-bud was long in proportion to the slowness of germination. In some cases an interval of five or six days was noticed between the seedlings of the two categories. The vigor of the plant was uniformly superior in those cases where the germination was rapid, and, moreover, when subjected to analysis, the amount of dry matter as distinguished from water was always greater in the quickly than in the slowly developed plants.

But the most remarkable results are those relating to the production of double flowers. In all the varieties the proportion of double flowers was greater in the case of those that germinated quickly than in the case of the laggards. Ten plants of one variety with violet-brown flowers, grown rapidly, produced all double flowers, while eight plants of the same variety, which had germinated slowly, produced all single flowers. The following figures convey other striking illustration of the facts now mentioned. Of one hundred plants belonging to nine different varieties, the proportion of double flowers, according to the period occupied in germination, was as follows:

	Doubles.	Singles.
After rapid germination.....	82.56	17.44
After slow germination	27.03	72.97

It may be suggested that the superiority might be attributable to the varying influence on the same seeds of light, heat or moisture; but the experimenters reply that the tendencies exist in the seeds themselves, for the two categories of seedlings were exposed to identically the same conditions, and yet showed the differences already mentioned. Moreover, although those seedlings which were grown on in sterile sand were much less vigorous than those grown in good soil, they, nevertheless, showed corresponding inequality as regards their flowers. Again, next to never was a single flower found in the spikes, bearing from ten to thirty double flowers, and conversely.

Lastly, hybridization shows that the seeds contain in themselves, unaffected by other conditions, the essence of what will be manifested in the plant later on. It must be added that there is in each variety a special tendency to produce double or single flowers, as the case may be. There are some which, however treated, never yield any but single flowers, while others produce almost, or quite exclusively, double flowers, and are, in consequence, doomed to disappear.

These results are so striking that we cannot but think our great seedsmen will repeat the experiments in due season, and avail themselves of the valuable information thus placed at their disposal.—*Gardeners' Chronicle.*

Entomology.

The Red Mite on Trees.

IN the second number of this journal (p. 30) Professor A. S. Packard has a note on "The Red Mite on Verbenas," in which he describes the character of the injuries committed by this minute insect, and gives a summary of the most efficient remedies known. It is usually considered and spoken of, by gardeners and horticulturists, as being most troublesome and injurious to plants in green-houses and conservatories, and occasionally to shrubs, etc., growing in the open air.

With the exception of the two instances quoted below, I do not know of any record of its injuries to large forest or shade trees in this country.

In Europe it is mentioned by several writers as attacking the Linden. In "Economic Entomology, Aptera," by Andrew Murray, those found upon the Linden are given under the name of *Tetranychus tiliarum*, and they are said to "occasionally occur in such numbers as almost to denude the trees of their foliage."

During the past summer, and also in 1887, I have found these little pests attacking, and quite seriously injuring, the foliage of large trees in the Arnold Arboretum, and on the parks and streets and other places about Boston.

The White Oak (*Q. alba*) seems to have suffered more than any other, but all Oaks, both native and those that have been introduced from foreign countries, have been more or less attacked. Those trees with very smooth, shining leaves seem to be least liable to injury, but by no means exempt, as the foliage of *Quercus rubra, Q. coccinea* and others very often showed too well. I have found the mites living almost exclusively on the upper surface of the leaves of all the Oaks, spinning a very slight web, which is almost invisible, but the existence of which may be proved by brushing the leaf with a camel's hair brush and thus accumulating the webs. In some instances a few were found on the under side of the leaves, but these seemed to be stragglers.

The effect of their work on the Oak is to give the foliage a general dusty aspect, the leaves become yellowish or grayish above, with lighter patches here and there, and they are frequently so much injured as to become twisted and turned, as if scorched. On some Oaks, such as *Q. palustris*, the leaves become of an even, dull, ashy color all over the upper surface.

It should be stated here that the blotched yellowish or dusty appearance of the Oak leaves is not always entirely produced by the red mite, but is very often caused, either independently, or with the assistance of the mite, by a hemipterous insect, *Corythuca arcuata*, which may be found on the under side of the leaves, from which they suck the sap with their slender beaks. The delicate wing-covers are flat, meshed and scale-like, of a white color, with a dark band across the base and another at the tip, but the dark spots vary in different individuals and are sometimes very faint or entirely lost. The body is black and the largest specimens are about one-sixth of an inch in length. They usually feed in groups, causing the opposite upper side of the leaf to become gray or yellow. On very many Elms the foliage has had a dusty, grayish look, which, upon close examination, has proved to be the work of vast numbers of the red mites living upon both sides of the leaves, but, generally, most abundant on the lower surface.

They live chiefly on the under side of the leaves of the Maple, which either turn an even yellowish gray or become thickly dotted.

They are to be found on the Linden, Ash, Locust and other shade trees, and on the Apple, Plum, Cherry and Peach. The amount of damage done to these trees has not generally been serious enough to attract much attention, but I have seen vigorous young Plum trees lose all their leaves during the month of August, entirely owing to the work of myriads of red mites upon them.

I have found them in large numbers on the American and European Larches, on the Hemlock (*Tsuga Canadensis*), and also quite common on Arbor-vitæ, Spruces, Junipers and White Pines. The foliage of the Larch assumes a dead, brownish appearance when seriously attacked, while the leaves of the Hemlock become of a dull ashy or dirty white color.

In the *American Entomologist and Botanist*, April, 1870 (Vol. 2), p. 180, Professor C. V. Riley says of the mite: "It is best known in the green-house, but likewise does much damage in dry seasons on trees (especially evergreens) in the open air. It thrives best in a dry atmosphere, and we have found no difficulty in getting rid of it by a free use of its natural enemy—water. If a little soap is mixed with the water it will be more effectual."

In the "Fourteenth Report of the State Entomologist of Illinois" (1884), p. 117, Professor S. A. Forbes says: "In June the foliage of the Larches in the grounds of the University at Normal, were seriously affected by the red spider (*Tetranychus telarius, L.*), some of the trees seeming likely to die. On one of those worst infested we tried the effect of spraying with kerosene emulsion made with soap and diluted to contain two and one-half per cent. of kerosene. The insects were greatly reduced in number by a single application, but not all killed. The trees soon revived appreciably, as compared with those not treated."

In examining the mites on different plants, I find that there seems to be a marked variation in their color on some kinds of trees and shrubs. In most cases they are of the typical brick red color, varying in intensity on different plants as well as in the age of the mites. These are usually described as light yellow when young, becoming darker as they grow older.

Some of the Elms on Boston Common and the streets of the city were very badly infested, and, in some cases, almost completely defoliated, during the latter part of the summer, by this or a similar mite, which seems to be of a yellowish green color in all stages of its growth.

At least, on several young trees, from ten to fifteen feet in height, which were literally swarming with mites, so that even the limbs and trunks were covered with their fine web, I was unable to find any specimens of a decidedly red color. Those found on the Butternut were also pale yellowish green. On the White Ash (*Fraxinus Americana*) they vary considerably

from the type in color and in the greater amount of web spun. They are yellow, inclining to orange, with what appear as dark spots, of varying size, on the body, but which is probably the food within seen through the transparent skin. Whether any of these variations may constitute separate species or varieties remains to be determined by some specialist.

The past season has been unusually damp and cool, yet the mites have been very abundant, and have shown remarkable hardiness and tenacity of life in prolonged cool and wet periods. Dry seasons are said to be most favorable to their increase, and, if this is so, they may yet prove a serious annoyance to the landscape-gardener. Trees with very thick, tough leaves, such as the Oaks, may be able to withstand their attacks without showing material injury, but the effect produced is certainly not pleasing from an artistic point of view.

Arnold Arboretum. *J. G. Jack.*

New or Little Known Plants.

Berberis Fendleri.*

THE common Barberry, which is so abundant in many places, especially on the hills of New England, though not a native, is our best known representative of the true Barberries. Its bright foliage and not ungraceful habit, its usually abundant, drooping racemes of yellow flowers in spring, and its still more conspicuous bright red berries in autumn, make it decidedly ornamental. Our native species resemble this very closely in most respects. *Berberis Canadensis*, not at all Canadian, as its name would indicate, is confined to the Alleghanies, and is common on stream-banks from Virginia to northern Georgia. The leaves are paler than in *B. vulgaris*, and somewhat glaucous, the flowers are smaller and in much shorter racemes, or nearly corymbose, and the fruit is shorter and more oval or almost globose.

The *B. Fendleri*, of which a figure is given, belongs to the more southern portion of the Rocky Mountains. It was first found by Fendler forty years ago in the mountains near Santa Fé, and has since been collected a little farther to the east on the upper Pecos, northward near Taos, and at the forks of the Rio Grande in southern Colorado. It is of rare occurrence within this limited range. The true Barberries, therefore, which in the Old World extend across the continents of Europe and Asia from England to Japan, are restricted in America to two small mountain districts on the eastern side, being replaced in the west and south-west by the Mahonia section of the genus, and reappearing in South America as evergreen shrubs, of which the cultivated *B. Darwinii* is an example.

The leaves of *B. Fendleri* are green and lucid, while the stem and branches are purplish and shining as if varnished. The flowers are as large as in *B. vulgaris*, in racemes an inch or two long, and at the base of the calyx are a number of smaller, but conspicuous, red bracts. This species flowered in the Botanic Garden here in 1880.

Cambridge, Mass. *S. W.*

Cultural Department.

The Vegetable Garden.

THE two great dangers which threaten vegetables that have been lifted and stored early are too much moisture and too much protection. They should be kept dry overhead, cool and well ventilated. Cauliflower, planted out about the 1st of July, is now in full head, and another crop, set out from pots about the end of the month, is showing flower; that planted after Potatoes early in August is later, but the appearance of the hearts gives promise of heading soon. As frost injures the hearts of Cauliflower, in the case of well-developed heads we break a few of the outer leaves and bend them over the hearts to protect them; undeveloped heads are so encircled with leaves as to have protection enough. But it is unsafe to trust Cauliflowers out-of-doors after this time of year, and we are now lifting and storing it in cold-frames, to be covered with sashes, mats or thatch as occasion requires. In preparing these frames we are particular to have them in a sheltered situation, to save covering in winter; and we make the pit two feet deep at the back, and eighteen inches deep at the front, banking it with the earth removed from within the frame. The plants are then lifted, stripped of their rougher outside leaves, assorted according to their stage of growth, and planted closely together in the frame. As the heads may not have room enough if the plants are set perfectly upright, the stalks are made to lean, the several rows overlapping each other shingle-fashion. By assorting and storing according to their ripeness, we may begin at one end of the frames and cut clean towards the other, and avoid picking out a head here and there as it matures. And this lessens labor in covering. Late Cauliflowers—that is, plants just showing signs of heading—will, when treated in this way and protected from frost, develop flowers during the winter, and be ready for use in January and February, and sometimes continue till March, when they are highly appreciated. The Erfurt—and some of its varieties, Snowball, for instance—are the best kinds we have this year. Leonormand's and Algiers have not given as good satisfaction as they once did. About Riverhead, in Suffolk County, where Cauliflower is grown in large quantity for New York City markets, the Erfurt has come to be the main crop cultivated.

Brussels Sprouts are much hardier than Cauliflower, and we leave them out-of-doors till severe winter weather is likely to set in in December, then we strip off their rougher leaves, lift and heel in the plants close together in a pit, shed or cellar, where they can have light and be kept cool. They usually grow so tall they are awkward to store in ordinary cold-frames. We also have good success with them by lifting and heeling them in quite close together in a warm, sheltered spot out-of-doors, and where we can conveniently construct about them some sort of a temporary shelter—of evergreen branches oftenest.

Cabbages we leave undisturbed so long as there is no danger of the ground freezing hard, say till about the end of November, and often December. We winter them in several ways: The mature ones, with heads down and close together, in out-door trenches; somewhat younger ones, with heads up and stored in frames after the manner of Cauliflower, or with heads up and close together in a shed or cool cellar, or in a bed outside six feet wide, and covered over with some sea-thatch, Oak leaves or evergreen branches. When stored outside we cannot always get them in winter, and therefore for every-day use it is more convenient to have some in a cellar, shed or frame. When packed together with heads up they are apt to grow a little in winter and burst open, but this does not happen when they are bedded with their heads down. Flat Dutch and All Seasons are capital late Cabbages, and the Drumheads are good, but sometimes a little coarse. The Savoys are the finest of all Cabbages for family use, and they are as easily grown as are the plain-leaved Cabbages. The Drumhead Savoy is the variety mostly grown for winter work.

Curled Kale is a capital winter vegetable, and easy to handle because it is very hardy, and half-grown plants are as good as mature ones. Kale can be grown as a catch crop any time after July. Extra Dwarf Curled Erfurt is the finest variety I know. It really is dwarf, much curled, and hardy. Many of the so-called Extra Dwarf Curled Kales have umbrella-heads and stems two feet long. About the end of November lift and replant closely, and when the ground freezes throw a few dry Oak leaves about them, and over these some evergreen branches. The Kale is always better for use after sharp frost; but sunshine and cutting winds in winter need to be guarded against, as they burn the curly leaves.

German or Siberian Kale, like Spinach, is usually sown in September in rows twelve to eighteen inches apart for use as greens in spring. After the surface of the ground is frozen an inch or two deep give it a slight mulching to protect it from sunshine, wind, very severe cold, and from being heaved out of the ground by frost in winter. Mulching before the ground is frozen over only invites field mice, which are very destructive to all covered crops in winter.

In this latitude part of the Celery crop should be stored some time in the latter half of November, according to the weather. Where several thousand heads are kept over out-door trenches or ridges will answer, but where only a few hundreds are to be wintered they should be stored in a shed or cool cellar. When the winters are severer than they are in New York, large growers have regular Celery sheds. For out-door wintering dig a long, deep, narrow trench in a sunny and well-drained space, say twenty or twenty-four inches deep and nine inches wide. Then lift the Celery, keeping all of one sort and all of the same size or earliness together, and stand the plants in these trenches in a single row, but as close together as they can be packed, filling in the soil and packing it firmly as the storing proceeds. Before storing, all sprouts and diseased

* B. Fendleri, Gray, Pl. Fendl., 51; Rothrock, Wheeler's Rep., vi. 60.

leaves should be removed from the heads. Never touch Celery to earth it up or to store it when it is wet or frozen. If one trench is not enough to contain the supply, prepare another alongside of, and about nine or ten inches distant from, the first one, and fill up in the same way. We run four of these trenches on one ridge, which is some seven to ten inches high in the middle, so as to throw off the water readily. We protect these ridges from frost with board coverings, and in severe weather use leaves, litter or thatch as an additional protection over the boards. As it would be impracticable to open these trenches every day in winter for a few heads of Celery, they should only be opened occasionally, and then a two or four weeks' supply taken out at a time, and brought into the cellar and stored upright in a prepared bed in a corner, or in boxes or halves of barrels. Celery is fairly hardy, and should never be covered too thickly. Never mulch the ridges till they first have a thin coating of frosty earth over them, and apply the mulch a little at a time rather than the full amount at once. Snow is a warm covering, but when a heavy coat of snow begins to thaw, shovel it off of the ridges, for snow-water is very penetrating, and the Celery must be kept dry.

Use the White Plume and Golden Self-Blanching first, then whatever kinds are now most blanched, leaving the red-tinged and green Celeries for latest supply. For all purposes we have nothing better than Golden Heart.

Glen Cove, N. Y. *Wm. Falconer.*

When and How to Prune Grape Vines.

NOTWITHSTANDING all that has been said and written about the numerous systems of pruning and training the Vine, few operations of the garden are practiced with so little intelligence. Many professional gardeners need no instruction in this matter and others are above receiving it. But to amateurs and novices it may be well to say, that the chief point to remember is, that the cane producing fruit next year is grown on this year's cane.

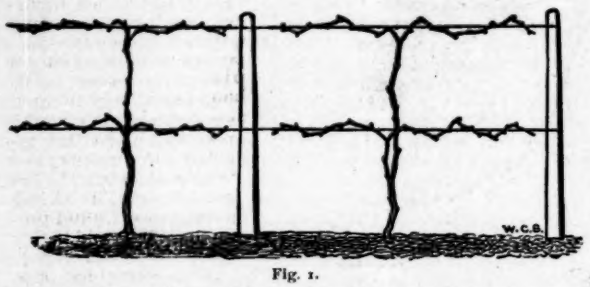


Fig. 1.

February was formerly considered the best time to prune Grape vines, but of late years fall pruning has rapidly grown in favor, and November is now chosen for this work by expert vine-dressers. The milder weather that is apt to prevail and the absence of snow make it far more comfortable for the operator, and vines that have been overtaxed and failed to mature their fruit can be treated with better judgment when their condition is fresh in the owner's mind, than if the work is deferred till February, when their condition may have been forgotten.

Another reason for fall pruning is, that the removal of surplus wood allows the vine to devote all its energies to more thoroughly ripening the remainder. The maturing and hardening of the wood is not complete when the leaves fall, neither is all wood apparently ripe sufficiently so to pass the winter uninjured. This winter killing of the young and immature wood is the strongest argument in favor of winter pruning, its advocates claiming that no mistake can be made then, as all wood that has safely passed the winter up to that period will continue to live. This is true, but the loss of any wood after pruning is generally too insignificant to be worth considering.

Unless these canes have attained a diameter of three-eighths of an inch or more, they should be cut back and the process repeated till they acquire that size. Vines thus treated will make canes of much greater value than if they had been allowed to grow and had been left to themselves.

The lateral branches that start on these canes should be shortened in to one leaf as they appear, thus forcing the energies of the plant into the main canes.

The vines are generally ready for trellising and training on any system that is decided upon the second season after planting and may be allowed to bear a bunch or two of Grapes. Many persons are so anxious for fruit that they allow the young vine to overload itself and thus receive a check from which it often takes years to recover.

The vigor and growth of vines vary so widely in different varieties that some require closer pruning than others, and it is on this point that intelligence and judgment are needed.

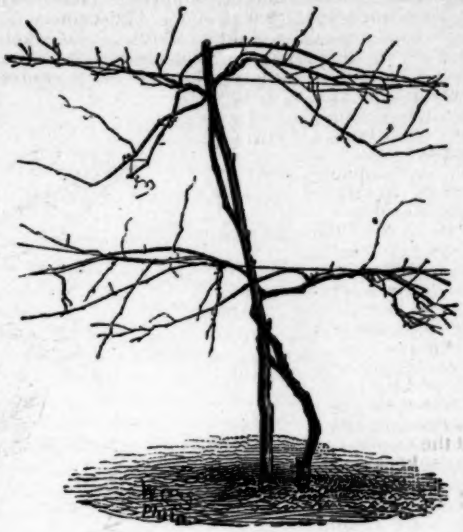


Fig. 2.

Short pruning gives increased size and fine clusters in a small space. Doubling the space may result in doubling the number of clusters, but not the weight of the crop.

The ground where vines are planted should be naturally dry or made so by drainage, and sufficiently fertile to insure a good growth. Those who have doubts on this point often propose to dig in plenty of stable manure, to which I say, No! unless it is thoroughly decomposed. Otherwise put it on the surface as a mulch and the fertilizing properties will find their way to the roots. Coarse or fine bone can be placed in direct contact with the roots without injury, and almost any of the standard commercial fertilizers may be worked into the soil at planting time, but unfermented manures should be placed on the surface.

The best vines to plant are those one and two years old, the roots of which should be shortened in to about ten inches in length. When older vines are wanted by impatient people they should have been transplanted yearly, so as to be supplied with well branched fibrous roots, which this shortening in process secures. Such vines, properly planted, will bear a full crop earlier than the younger ones, but, in two or three years, the latter will overtake them. A stake should be set with every vine, and one, or, at most, two shoots, allowed to grow the first season; they should be tied to the stake at intervals.

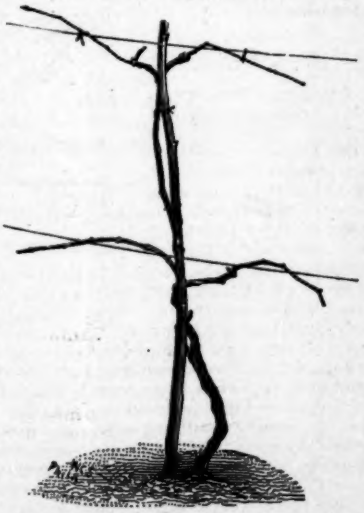


Fig. 3.

What is known as the Kniffen system of training, and its improvement, are the simplest of any I have ever tried, and they have, therefore, become more widely adopted perhaps than any other.

The cut (Fig. 1) illustrates the system at a glance. The vine on the left shows the original idea, pure and simple; that on the right the improvement, which consists of growing two trunks, from near the ground. The sap being divided

there, each head must get its allotted portion, while in the other case the upper head would be apt to get the lion's share on account of its tendency to flow to the highest point. The arms, which are renewed every year, being in a horizontal position, the buds start with more general uniformity than if they were more upright. The trellis is inexpensive, and is adapted to vineyard or garden. In the latter wood slats can do duty instead of wires.

Fig. 2 gives a view of a vine as it appears before pruning, and Fig. 3 the same vine after pruning. The canes forming the arms are the ones nearest the trunk of the vine, and are cut from five to eight buds long. If longer the buds nearest the trunk would be apt to start too feebly, and fail to acquire sufficient vigor for next year's arm; but if only five or six buds long, a very uniform growth is obtained. By stopping the growth of these young canes at the second or third leaf beyond the last cluster of fruit, the size of the cluster and canes is increased, and the base buds are fully developed, so that the one nearest the trunk generally makes as good a cane, and produces as good clusters as those farther away; and the fruit year after year is kept in a small area near the trunk of the vine. The chief objection to the system is that the wind and rain will sometimes break off the tender shoots while young and growing rapidly. To prevent this I have used an extra wire six inches above the arms, to which the young canes are secured, thus preventing any loss from this cause. I have taken this fall from single vines thus trained from twenty to thirty pounds of fine fruit, which satisfies me entirely as to quantity.

E. Williams.

Montclair, N. J.

Rose Notes.

American Beauty.—The strong growth and upright habit of this Rose make it conspicuous when planted out in the same house with other varieties. On good, healthy plants of this variety the shoots will often attain a height of six to eight feet, and usually terminate in one very large bud, the latter having taken a good while to develop, but generally proving to have been well worth waiting for. After this terminal flower has been cut, it has been found best to tie down the shoots, so as to induce the lower eyes on the plants to break, this process usually resulting in more numerous flowers from the secondary growth than would otherwise be secured, though in some instances the individual flowers may be smaller than those of the first crop. This Rose, in common with a majority of the Hybrid Tea class, being subject to attacks of "black-spot," should be watered carefully, so as to keep the roots in as healthy a condition as possible. This fungus spreads much more rapidly on those plants which have defective root-action.

Perle des Jardins.—In many cases the first crop of flowers of this standard sort will have been cut by this time, and it will be necessary to thin out some of the weak and comparatively worthless growth around the bottom of the plants, so as to allow more air and light. At the same time it is advisable to give a little encouragement to the new growth by the application of fertilizers, preferably in a liquid form, although good results may also be obtained from a top dressing of manure. An objection has been urged against the latter method by some growers, however, on account of the greater difficulty of regulating the amount of moisture at the roots of the plants when the surface of the soil is covered with a coating of variable thickness and consistency. But whichever method is adopted in the culture of this variety, it would be well to keep in view the opinions expressed by several of our leading Rose growers, to the effect that the malformed buds frequently seen on Perle des Jardins during the winter months, are largely due to too liberal treatment or overfeeding.

Fig. 72.—Berberis Fendleri.—See page 460.

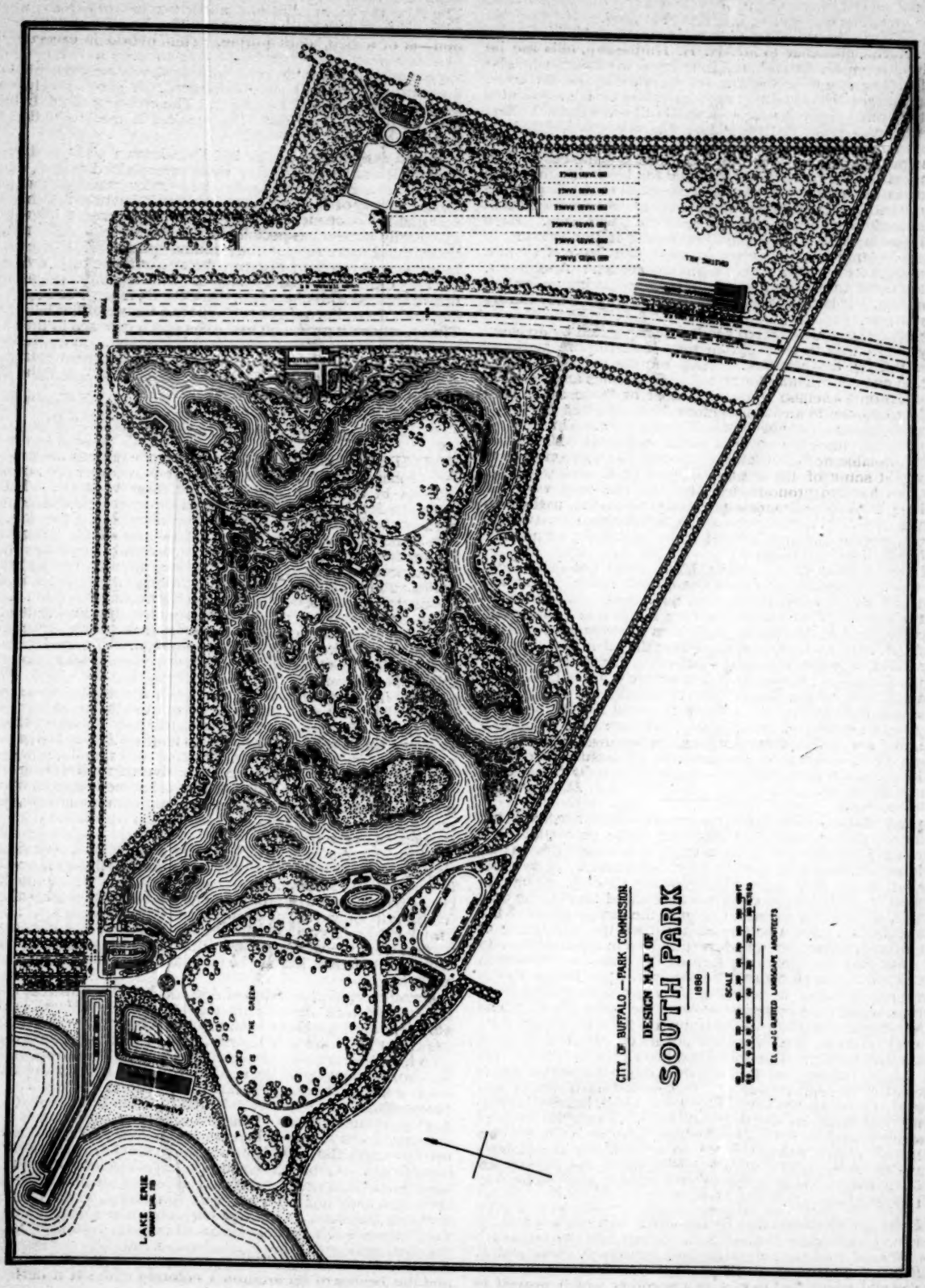
Papa Gontier.—It seems evident that this Rose can be grown to better advantage in a house by itself, where this is practicable, for when grown among other varieties its peculiarities may be forgotten, and it may suffer from too great heat or too much water, when the growth is sure to become weak and the leaves fall off rapidly. Papa Gontier is naturally a strong grower and quickly responds to proper treatment, giving a plentiful crop of its handsome buds in rapid succession. During the past summer it has received much praise where it has been tested out-doors, making strong growth and producing large and highly colored flowers.

The Bride has also made a place for itself in the foremost rank of Roses for winter use, and when afforded treatment similar to that recommended for its parent, Catherine Mermet, it usually produces a greater number of flowers of the same graceful form, and with the additional advantage of being white, and, therefore, of much greater general utility. In fact, this is now claimed to be the most useful white Rose in general cultivation. *W.*

Philadelphia.

Hardy Perennials for Autumn.

THREE of the best hardy plants for autumn blooming are the common *Aster Novæ Angliæ, Anemone Japonica*—both pink and white varieties—and various species of Kniphofia, commonly known as Tritomas. I think it would be worth the trouble to prepare a bed for these specially to bloom together. The Aster is quite hardy, increases rapidly, either by seeds or division, and requires no further care. *Anemone Japonica* cannot be relied upon here to endure the winter, nor even farther southward, in New Jersey, though Mr. Vick, of Rochester, reports that it is quite hardy with him,


CITY OF BUFFALO — PARK COMMISSION
DESIGN MAP OF
SOUTH PARK
1888
SCALE
THE GREEN
LAKE ERIE

and it would be interesting to know whether protection beyond snow covering is given, and, if so, what kind. Neither can the Kniphofias be relied upon to endure the winter.

Mr. Harris, gardener to Mr. H. H. Hunnewell, tells me he used to keep them through, until the last few winters, when he has lost them, by tying their leaves up in the shape of a cone, and putting a few leaves around the plants. He also states that they were hardy many years ago in the Annapolis Valley, Nova Scotia. However, the safest way is to store both Anemones and Kniphofias.

The propagation of *Anemone Japonica* is quite easy. The strongest crowns or roots are planted for blooming the same season in the ordinary border, and the small roots are put into nursery beds, where they will grow large enough in one season to bloom the next year. Any piece of root will grow. Here in Massachusetts, with September frosts, it is necessary to start the plants in pots, either in moderate hot-bed or in a green-house, to hasten the blooming period. Anemones, planted three in a ten-inch pot, make fine specimens for hall decoration. It is safe to water them three times a day during the summer.

Kniphofias are raised from seeds or propagated by division. They thrive well in a deep, rich loam, and require plenty of water during dry weather. They require a fully exposed position or they will not bloom well. Kniphofias are generally called Tritomas in the trade, and most of those sold are *K. aloides* or its varieties. It is seldom, however, that the varietal rank is given to any of them—all being entered in the catalogues as species. This causes much confusion. Nicholson, in his "Dictionary of Gardening," has, no doubt, been as careful as possible not to give any varieties of *K. aloides* specific rank, but some of the species I believe are only varieties. But it is hard to pronounce positively, since the authorities are not given. *K. carnosa* and *K. Leichtlinii*, from trustworthy dealers, grown together, proved to be identical; so also did *K. Burchelli* and *K. Rooperi*.

Of the varieties of *K. aloides*, Media does not differ from the type. Grandis and Grandiflora, both noble plants, are identical; so also are Nobilis and Saundersii, though somewhat inferior. There is also a very handsome hybrid with the pretty little *K. Macowani*, known as *Tritoma media Macowani*. *K. caulescens* is so very distinct that it might pass for a Dracæna as regards habit of growth. It forms a decided stem, and does not bloom until four or five years old, and then from the axils of the leaves, not terminally. I consider *K. Macowani* and its variety Corallina the best for this district. They bloom early and continuously, produce seed in abundance, and are very easily raised by that means, blooming the second year. No other Kniphofia is so useful for cutting for house decoration, the varieties of *K. aloides* being altogether too coarse.

T. D. Hatfield.

Wellesley, Mass.

Orchid Notes.—*Odontoglossum grande.*—This species bears the largest and showiest flowers of the whole genus, and is a desirable plant for any collection, as it is easily grown and produces its flowers at a very welcome season. It was discovered about fifty years ago, growing in dark ravines in Guatemala, and therefore cannot be classed among the cool Orchids, but will be found to require the temperature of the Cattleya-house. For a potting compost we use a mixture of peat, fibrous loam, rotten leaves and moss in equal parts, taking care that the pots are thoroughly drained. While in active growth the plants require plenty of water; after this is finished they should be rested in a dry atmosphere, and given no more water than necessary to keep the bulbs plump. The racemes appear as soon as the growth is finished, bearing six or seven flowers, the lanceolate sepals of which are yellow barred with brown. The petals are brown on the lower half and bright yellow on the upper; the pale yellow lip is blotched with red. *Saccolabium bigibbum* is a pretty and somewhat rare species of close-growing habit, bearing linear-oblong leaves about seven inches long. From the axils of these are produced very short-stalked racemes with about a dozen pale yellow flowers. The lip is curiously saccate and triangular, white, with a yellow centre, while the edge is exquisitely frilled. It is a native of Rangoon, and grows well with the Phalænopsis.

Phalænopsis intermedia Portei.—This is a choice, and, at present, exceedingly rare Orchid. When first introduced it was thought to be a natural hybrid betwen *P. rosea* and *P. amabilis*; and to prove this Messrs. Veitch & Sons crossed these species and succeeded in raising a seedling which proved to be identical with those received from their native country. This same seedling is in bloom with us now, bearing a large, branching spike. In growth it much resembles *P. amabilis*, while the inflorescence presents an intermediate character. The flowers are roundish and about two inches across; white suffused with rose near the base. The lip—the great attraction—is of a rich, dark purple. This hybrid is exceedingly free flowering, in fact it is difficult to keep a strong plant from being always in flower; but this should be prevented or the plant will soon become exhausted. It grows freely with the usual Phalænopsis treatment. The crossing of this hybrid with its parent, *P. amabilis*, has resulted in the production of that fine hybrid, F. L. Ames.

Vanda insignis is an old, but little known plant, and until recently it was very rare. For some unexplained reason, it has always been confounded with the slender-growing, narrow-leaved variety of *V. tricolor* called *insignis*, but now that the former plant is once more in cultivation, the difference in growth may easily be seen, especially in the leaves, which are much shorter and more rigid in the genuine species. The racemes bear some seven flowers about the size of those of *V. tricolor*, but they differ a good deal in shape. The sepals and petals are brown spotted with chocolate, while the lip is large and spreading, and of a uniform light rose. It is a native of the Island of Timor, where it grows on low trees much exposed to the sun, resting for a long time during the dry season. In cultivation it grows and flowers freely with the usual Vanda treatment. A beautiful and rare variety named Schrœderi has light yellow sepals and petals, and a pure white lip.

Kenwood, N. Y. *F. Goldring.*

Notes From the Arnold Arboretum.

DECIDUOUS shrubs or trees which still possess beauty of foliage or of fruit after the 1st of November are not numerous in this climate and are therefore valuable. There are still a few in this collection; and these can be mentioned, perhaps, with advantage to persons contemplating the formation of new shrubberies. The Yellow-root of the Alleghany Mountains, *Zanthorhiza apiifolia*, a low shrub, specially valuable on account of its spreading habit for the margins of shrubberies and for clothing the ground among larger plants, is still covered with leaves, which are now bright orange colored. The small brown flowers of this plant, which appear in slender drooping racemes contemporaneously with the unfolding leaves, are neither showy nor ornamental. The real beauty of the Yellow-root is in the late autumn, when brightly colored foliage is not common.

Berberis emarginata, which has been mentioned more than once in these notes, is now at its best, and it is hard to imagine any shrub with more brilliant or strikingly colored foliage. *Berberis Chinensis* is very brilliant, too, but *B. Thunbergii* has already lost its leaves entirely. The fruit will remain, however, upon the branches bright and unshriveled until spring, and considerably later than those of the last named species, which on the whole, although still almost unknown in gardens, is a more graceful and desirable plant and unsurpassed among Barberries in the beauty of fruit.

Spiræa Cantoniensis, which is often known as *S. Reevesiana* and of which there are a single and a double flowered variety in cultivation, is remarkable among Spiræas for the persistence of its leaves in autumn. They are still quite green and fresh, with only a slight change to yellow in the case of a few growing low down upon the stems. It is one of the most ornamental of the whole genus, although here unfortunately it is not quite hardy, losing the ends of the branches in severe winters.

Parrotia Persica, a native of the south and south-west coast of the Caspian Sea, and nearly allied to the Witch Hazel, is now a brilliant object, with its broad, golden colored leaves. This is a tall growing, robust and hardy shrub, which is not very often seen in American collections, although worth growing for the handsome coloring of its autumn foliage. Neither the flowers nor the fruit are at all showy. A second species, *P. Jacquemontiana*, a native of the Himalaya from the Indus to the Ravi, does not appear to be in cultivation. This plant is interesting from the fact that its tough and pliable twigs are used to make the swinging twig-bridges over the great Himalaya rivers. Among Viburnums, *V. cotinifolium* is now the only one which needs mention. It is a stout and spreading species, a native of the north-west Himalayas, where it grows between 4,000 and 11,000 feet elevation, and closely allied to the European *V. Lantana*. Its broad ovate or rotundate leaves are just turning to a deep, rich vinous red color. This plant has not flowered here yet, but the persistency of its foliage and the beauty of its autumnal coloring make it a desirable addition to the list of hardy shrubs.

Cornus sanguinea is the last of the Dogwoods to hold its leaves and its bright black fruit. This is the common Dog-

wood of Europe; it is a hardy, fast-growing shrub, but of no great ornamental beauty. Loudon's suggestion that its specific name is due to the bright coloring of the foliage in autumn is not a very fortunate one, if we can judge by its behavior in this country, for no plant retains here green leaves more persistently.

The Washington Thorn, *Cratægas cordata*, is still a brilliant and beautiful object, with its small, bright red fruit and orange and scarlet leaves. This is one of the most rapid growing and desirable of all our Thorns as an ornamental tree, and it is free or nearly so from fungus attacks, which ruin the beauty early in the season of many Thorns. Formerly it was much more generally planted, especially as a hedge plant, for which purpose it is well suited, than at present. It is one of the most desirable of the smaller North American trees for ornamental planting. The foliage, however, of *C. arborescens*, is still more brilliant, surpassing here this year not only all other Thorns, but nearly every plant in the collection. *C. arborescens* is found in the south Atlantic States rather sparingly, and again west of the Mississippi River from Missouri to Texas. Like many of the other Thorns, it is most common and most fully developed in the valley of the Red River; here it is, when in bloom, a conspicuous feature of the region, bordering the low, wet prairies and the banks of streams, sometimes reaching a height of forty feet, with a round, wide spreading top. The bark of the trunk is much lighter colored than that of the other species, and the flowers, although small, are produced in the greatest profusion. The fruit is small, hardly larger than a pea, and bright red. It is rather a surprise that this plant should prove hardy here. So far, however, it grows vigorously and rapidly, and its further development will be watched with much interest. The astonishing and unsurpassed color of its foliage at this season of the year, should give this Thorn a place in every garden where it can be grown successfully.

Quercus Georgiana is one of the rarest plants found growing spontaneously within the limits of the United States. It is a low spreading bush, with leaves not unlike those of the Scarlet Oak, with smooth and shining saucer-shaped cups, and oval, globose acorns, and it is found nowhere else than upon the summit of Stone Mountain, in Georgia. This interesting shrub is perfectly hardy here, and just now its leaves are of the most intense scarlet color.

The genus Smilax is only represented in the collection yet by three species. Of these, *S. Pseudo-China* still retains its dark green leaves, which show no signs of turning to any other color before falling. The leaves of *S. rotundifolia*, the common Green- or Bull-brier, were brilliant scarlet and orange a few days ago, although now they have nearly all fallen, while those of *S. glauca* are just turning orange. These are all useful and handsome plants, and were they less common, they would be often seen in gardens, especially the Green-brier, which is one of the very best plants which can be used in this climate to make a shrubbery, or a boundary wall impenetrable and impassable.

Among North American trees, none, perhaps, retains its foliage green and fresh so late in the season as the Nettle tree, *Celtis occidentalis*. The leaves are all upon the branches still, and only here and there show a tinge of yellow. This is not a common tree east of the Hudson River, but further west and south, and especially in the far south-west, it is one of the largest, and most widely and commonly distributed of our native trees. It varies remarkably in habit and in the size and shape of the leaves, and botanists have at different times, for this reason, applied to it several different names, believing that there were several species, although it is probably wiser to consider all the different forms as included in one variable species. Sometimes it is a low bush only a few feet high; sometimes, especially in the Mississippi Valley, it is a tall, wide-spreading tree, with rigid branches, and a tall, straight trunk; in the valley of the Rio Grande it is low and wide-spreading, resembling an Apple-tree, with a short trunk and round head. Upon the banks of the Hudson River, opposite Newburgh, in New York, it grows with a slender trunk, and long, graceful and pendulous branches, which give to these trees, in this particular region, a character peculiarly their own.

It is certainly remarkable that this tree is so little known to horticulturists and so rarely planted. It is easily raised and grows rapidly. It is readily transplanted, and it is not at all fastidious about the soil in which it grows. It is an excellent tree to plant upon the lawn or along the road-side, and yet it is practically unknown in nurseries, and in the east certainly it is never planted—a fact which can be partially explained, perhaps, that it resembles somewhat, although a smaller tree, the Elm in habit and general appearance, and so has never become familiar to persons who are not botanists. *J.*

November 6th.

The Forest

The Forest-tree Plantation of the University of Illinois.

THIS timber-tree plantation was begun in 1871 and covers about fifteen acres, with twenty-five species. The land was originally prairie, the usual deep, black, loamy soil, but varies considerably in richness and drainage. During thirty years previously the land had been used in ordinary farming, had never received manure of any kind, but was still good enough over the greater part of the area to produce average crops of Corn—say, fifty bushels to the acre. A part, however, was not so good. This last is upon the highest and naturally best drained portion, where, without manure, few field crops would satisfactorily grow. The lowest parts are too wet in spring-time for early tillage. Tile drains in this part would, if put down three feet, carry water at least half the season. None, however, have been laid. An open ditch across the plantation is the only artificial outlet for water. This does not usually dry up until after midsummer. The latitude of the place is a few miles north of the fortieth parallel.

The trees are in north and south rows—those first planted four feet apart; the later ones, eight feet apart. The earlier plantings were made two feet; the later, mostly four feet apart in the rows. Thinning has been practiced from time to time, by removing alternate rows among those at first four feet apart, and by cutting away from one-half to three-fourths of the trees from the rows. As the stand was originally good, the trees are now quite thick upon the ground.

The following table gives the kinds and quantities of trees and date of planting, together with the average measurements of the trees, on July 27th, 1888:

	Acres.	Distance planted.	When planted.	Age in years.	Average height, feet.	Average diameter, inches.	Condition.
Ailanthus		4x8	1881	2	20.4	9.	×
Apple		4x4	1876–7	4–5	23.5	11.2	××
Ash, Green	3	2x4	1871?	3	39.7	21.	××
Black Walnut		2x4	1873	4	37.1	27.7	×××
Box Elder		2x4	1877	Seed.	34.9	18.	×××
Butternut		2x4	1871	2	31.5	19.	×
Catalpa, Hardy		4x8	1881	2	23.1	16.	×××
Catalpa, Tender		2x4	1871	2	32.1	23.	×
Cedar, Red			1871	2–3 ft.			××
Chestnut		2x4	1871	2			
Elm, American		2x4	1871	2	37.1	22.7	××
Hickory, Small Nut		2x8	1880	Seed.	6.	3.7	××
Hickory, Large Nut		2x8	1880	Seed.	9.6	5.7	××
Honey Locust		4x8	1882	2	18.	9.2	××
Larch	2	2x4	1871	1	39.1	28.7	×××
Linden		4x8	1881	6	23.2	12.	××
Maple, Hard		2x4	1873	3–7	25.5	12.	×××
Maple, Soft		2x4	1871	3	53.8	30.1	××
Oak, Burr		4x8	1885	4	9.1	5.	××
Osage Orange		2x4	1871	2	27.9	16.	××
Pine, Austrian		4x4	1872	9–12 in.	28.2	19.7	××
Pine, Scotch		4x4	1872	1–2 ft.	33.3	23.5	×××
Pine, White	1	4x4	1872	12–15 in.	30.4	20.	×××
Spruce, Norway		2x4	1872	12–15 in.	38.5	17.2	×××
Willow, White		2x4	1871	1	54.8	30.2	×××

In the column showing the present condition of the various kinds of trees one × denotes poor; two, fair, and three, excellent order. The last are thrifty, fine in shape, and in every way promising.

This comparison of the degree of successful growth among the different varieties is perhaps the most instructive thing in the plantation. It is easy to see that some kinds thrive when planted quite thickly in blocks by themselves, while other varieties, which may succeed in the open ground or in mixed plantations, fail if thus crowded by trees of their own kind.

Another table, giving costs and receipts, will be found interesting. It will be seen the latter are very small, mostly from sale of the young trees for transplanting. There should also have been a small credit for stakes and poles used on the farm, for which no account was kept. So far nothing can be said in favor of the undertaking for profit, whatever may be the ultimate outcome. Surely fuel cannot be profitably grown in this way when the best cord-wood sells for $5.00, delivered, and good bituminous coal for $3.50 per ton. Ordinarily, the thinning has been done for the product cut away.

	Cost of trees.	Cost of planting.	Cultivation, etc.	Total cost.	Receipts.
Ailanthus	$10 40	.....	.....	.....	.....
Apple	50 00	$25 20	$15 00	$90 20	.....
Ash, Green	76 94	42 58	190 63	310 15	$35 00
Black Walnut	24 00	8 50	21 14	53 64	.....
Box Elder	2 00	.....	11 00	13 00	20 00
Butternut	20 40	3 43	24 23	48 06	.....
Catalpa, Hardy	2 00	5 50	6 50	14 00	8 00
Catalpa, Tender	21 77	4 17	43 37	69 31	5 00
Cedar, Red	.....	.....	.....	.....	.....
Chestnut	30 00	6 79	14 65	57 44	.....
Elm, American	4 76	3 95	10 39	19 10	7 00
Hickory, Small Nut	3 50	.....	6 00	9 50	.....
Hickory, Large Nut	4 50	.....	9 00	13 50	.....
Honey Locust	10 00	6 40	5 00	21 40	.....
Larch	98 00	21 20	189 44	308 64	2 50
Linden	10 00	6 40	5 60	20 00	3 25
Maple, Hard	20 00	10 60	20 26	50 86	65 00
Maple, Soft	8 16	6 17	11 09	25 42	.....
Oak, Burr	15 00	6 00	2 00	23 00	.....
Osage Orange	5 44	4 78	14 14	24 34	5 00
Pine, Austrian	30 00	4 40	69 36	103 76	.....
Pine, Scotch	30 00	4 25	48 14	82 39	2 50
Pine, White	122 49	9 85	250 45	382 69	.....
Spruce, Norway	29 94	7 45	34 92	72 31	30 00
Willow, White	8 00	4 57	27 49	40 16	.....
Totals	$637 30	$192 28	$1029 79	$1846 87	$183 25

Among the trees which flourish when planted by themselves are the Conifers in general, the Sugar Maple and hardy Catalpa. The European Larch is planted in long rows, reaching from the driest to the wettest portions of the soil. On the first it has done magnificently well. The trees are now about eight feet apart each way, evenly distributed, uniform in size, beautiful in shape, and thrifty in growth. On this part of the ground they average ten to thirteen inches in diameter of trunk. On the lower and richer land they are practically a failure, not from the richness of the soil, but from the excess of water.

The White Pine is quite as promising, and thrives remarkably even upon the wet soil. The trunks are straight and tall, vieing in friendly rivalry to reach the sunlight above them, and beneath excluding it by the density of their shade.

The Norway Spruce also does well, and on the low as well as the higher ground, while the Scotch (Riga) Pine comes in as a fair second to these three of the first and finest growth. But the Scotch is not so agreeable in company. Those gaining the advantage crowd out the weaker plants to a greater extent; the limbs show the same tendency among themselves, and thus a few large side branches live longer, and ultimately form larger knots than are found on the trunks of the other kinds.

The Austrian Pine is the least successful among the Conifers, owing principally to a fungous disease affecting the foliage.

The hardy Catalpa stands at the head of the list of flat-leaved kinds for quickness of growth, erect, symmetrical shape and durability of wood. The other species, *Catalpa bignonioides*, is too often injured by the winter to be successful. The Hard or Sugar Maple grows slowly when young, but after the first ten years rapidly overtakes some of the more precocious kinds. Both the Maple and Catalpa thrive excellently in close association among themselves, their dense shade keeping the ground beneath free from undergrowth of all kinds. This is only partially true of the Black Walnut. While it is marked among the thrifty and promising kinds, the trees will evidently do better in mixed plantations, as usually found in nature. Its shade is not very dense, but its vigorous roots will not let many other trees have much chance near by. A proper selection and alternation is sure to be useful in this case.

A mistake was made in the Ash trees. White Ash (*Fraxinus Americana*) was to have been planted, but the nurseryman who sold the seedlings and the committee who bought them were alike unable to distinguish this species in the seed-bed from the Green Ash (*Fraxinus viridis*). The same thing often happens among those whose business it is to handle trees and nursery stock, but this no less makes the blunder a bad one, and one that surely ought to be avoided. But the Ash trees generally thrive greatly better in mixed plantations, and the Green Ash conspicuously so. The average diameter of the trunks of those planted in a block by themselves, about eight by twelve feet apart, seventeen years old, is seven inches, while some of these same trees, taken as thinnings from the rows and planted elsewhere, are nearly double this size. In the block the trees are also very irregular in size. The smaller ones are not killed outright, but have little vitality and make slow progress. Among no other kind of tree is there so much undergrowth of vines, shrubs and weeds. They are evidently incapable of utilizing the sunshine in any such exclusive way as the Pines and Maples.

In the same way the Osage Orange is a failure. A specimen left here and there in a hedge does remarkably well for some years, and even thickly planted in a single row the trees are fairly successful; but they have badly disappointed many in their poor growth in the plantation. Planted originally two by four feet apart, they have from time to time been thinned to about eight by eight feet. Now, at the end of sixteen years, they averaged only five inches in diameter of base of stem. Neither are the trees in good shape for timber purposes, being crooked and scrawly in trunk and limbs.

The White Willows reach skyward above all the other trees and for summer fuel probably lead the list. It may be that for special manufacturing purposes this wood will be worth growing. The soft Maple (*Acer dasycarpum*) stands next the Willow in height, and makes clean, straight trunks with a dense canopy of foliage above.

University of Illinois. *T. J. Burrill.*

Correspondence.

To the Editor of Garden and Forest:

I have an Osband's summer Pear-tree, one-third of which has been grafted into the excellent Reeder variety. In the summer of 1887 the tree began to blight somewhat, and has continued to do so through the summer of 1888. As yet the Reeder portion of the tree has not been affected (with the possible exception of one small twig). Fearing that I may lose the tree, and desiring to preserve the Reeder variety, I propose to graft it (the Reeder) into other trees. Will it do to take the scions from the healthful Reeder portion of the blighting tree?

Amherst College, Mass. *A. D. Morse.*

The Pear blight is caused by *Micrococcus amylovorus*, Burrill, and can be transferred from diseased Pear-trees to healthy trees by natural contagion or by inoculation. If the Reeder portion of the tree of our correspondent has already one twig affected with *Micrococcus*, it would, of course, be unwise to take grafts from the immediately adjacent branches. It is probably safe, however, to attempt grafting with the more remote twigs of the Reeder portion of the tree. At any rate, if the object is to preserve the Reeder variety, it is certainly better to attempt to graft other trees with the apparently sound shoots of the Reeder portion, than to trust to the tree already grafted, a part of which, at least, is known to be diseased. It would, of course, be better still to procure grafts from other localities now free from the blight. It is to be hoped that our correspondent has before this cut off and destroyed the blighted branches on his tree. *W. G. F.*

To the Editor of Garden and Forest:

Sir.—In the issue of your paper for October 3d, in the description of *Rhododendron Vaseyi* under "New or Little Known Plants," I noticed a mistake in regard to the locations in which it has been found growing. It was stated that it was "found in Cashier's Valley, South Carolina," etc., subsequent to its being discovered by Mr. Vasey, near Webster, in Jackson County, North Carolina. Cashier's Valley is in Jackson County, North Carolina; and from the best information I find that *R. Vaseyi* has not been detected outside of this state, and only in two counties—Jackson and Mitchell. It may be of interest to add that *R. Vaseyi* has been found growing quite to the top of Grandfather Mountain, at almost 6,000 feet elevation, and in this high location it seemed to be perfectly at home, being vigorous and flourishing.

Highlands, N. C. *H. P. Kelsey.*

[By an oversight, the name of the town near which *R. Vaseyi* was found during the present season, appeared in our description as Louisville. It should have been Linville.—Ed.]

Periodical Literature.

IN a recent number of *Nature* are summarized a series of articles, written for *Les Missions Catholiques*, of Lyons, in which M. Armand David, a Lazarist missionary and distinguished man of science, recounts the scientific gains which have accrued to the world through the labors of Catholic ecclesiastics in the East. Few persons realize how great these gains are—how much self-sacrificing energy has been spent by missionary priests in studying the flora and fauna of the regions where their proselytizing work is carried on. In China especially their labors have been invaluable. To speak of botany alone, the first work of importance on the flora of China, published this year at the expense of the French government, in two finely illustrated quarto volumes, describes M. David's own collections, and is called "*Plantæ Davidianæ*." Although it contains only a small proportion of the plants native to the empire, it deals pretty fully with those of the northern provinces and the Mongolian mountains, and adds largely to the list of the discoveries of English and Russian explorers. Many important European genera—like the Trefoils, for example—are not found in China, but many American plants have their representatives which are not represented in Europe—as Pavia, Bignonia, Aralia and Dielytra. A pretty plant (*Xanthoceras sorbifilia*), much cultivated in Pekin, M. David found growing wild in Mongolia, and successfully introduced into France. Another find was *Davidia involucrata*—a comparatively tall tree with large leaves, for the introduction of which, we are told, a considerable reward has been offered by an English amateur. M. Delavay is another missionary who, inspired by M. David, and, like him, helped with government money, is exploring with much success. His residence in the almost unknown province of Yun-nan gives him a good field for work, and the collections he has sent to France are the most important yet received, and will soon be published with M. Frauchet as editor. Where only one Chinese Primrose was formerly known, M. Delavay has raised the list to more than thirty. Instead of four or five Chinese Rhododendrons, forty-five have been made known through his labors and those of M. David. Several new species of Vine have also been discovered, among them one (*Spinovitis Davidiana*) found in a wild state in the central mountains of Tsin-lin, is noteworthy as having its stems covered with spines. Many other priests devote much of their time to forming collections for the French museums, and it would be difficult to overrate the sum total of their services, which, moreover, have been as great with regard to the fauna as with regard to the flora of the East.

Horticultural Exhibitions.

The Philadelphia Chrysanthemum Show.

THE Chrysanthemum Show of the Pennsylvania Horticultural Society, held in Philadelphia last week, was especially strong in the number and quality of the plants exhibited. The floor of the spacious hall was filled, and almost every plant was worthy of mention for its healthful appearance and its abundance of well-developed flowers. The general effect of this mass of color was admirable, and it was heightened by the garlands of Laurel, the Palm branches, the evergreen boughs, the bright-colored autumn leaves and berries, the bunting and Japanese lanterns, with which the walls and balconies, stairway and stage had been decorated by the Florists' Club of the city. There were fine examples of plants struck in summer and carrying a single bloom, but they were comparatively few. The cut flowers were of excellent quality, and while no single fifty equaled Judge Benedict's collection in New York, there were many more of them, all told, and the general average was better.

The finest plants in the hall were specimens of Marvel, Grandiflorum, Lucrece (new), Mrs. Frank Thompson, Mrs. C. H. Wheeler, Mrs. A. Blanc, Cullingfordii, M. Freeman, Robert Cranford, Bride (new), Mrs. William Bowen (new, brighter in color than Mrs. C. H. Wheeler, but resembling that fine variety), Mrs. William Singerly, Mrs. Joyce and Puritan. All these make the strong growth needed for exhibition specimens. Some of the varieties with most beautiful flowers, like Mrs. J. J. Bailey and Mrs. J. Wanamaker, do not grow large enough.

Among the noteworthy seedling plants exhibited was an unnamed variety grown by H. Surman, gardener to Mr. E. W. Clark. It is an improvement on his seedling, Mrs. E. H. Clark, which won the highest premium in 1887; a second was shown by William Jamison, and a third by Robert G. Carey, gardener to Mr. J. C. Price, of Chestnut Hill. The finest seedling plant was a specimen of the Mrs. W. K. Harris, the flower of which has been mentioned.

The most notable cut blooms exhibited here for the first time, and remarkable for size, color and quality, were Mrs. Alpheus Hardy, which has already been described in these columns; Mrs. William K. Harris, shown by Mr. Harris—of great size and substance, and probably the finest yellow Chrysanthemum yet produced; L. Canning, pure white, Mrs. M. J. Thomas, blush white, and E. H. Fitler, bright bronze yellow, incurved and distinct in form—the last three shown by Craig & Brother; Lilian B. Bird, the largest flower with tubular florets, and Kioto, chrome yellow, shown by E. L. Fewkes, Newton Highlands, Massachusetts; Wootton, white, shown by John M. Hughes, gardener to Mr. George W. Childs; and Mrs. Carnegie, John Thorpe's wonderful variety, for which a gold medal was awarded. The silver medal went to Robert Craig, for Mrs. Isaac C. Price, a beautiful yellow of large size and distinct form.

The premiums were very liberal. A prize of $100 was awarded to J. W. Colflesh for the twelve best plants. A second prize of $85 went to John Kinnear, gardener to Mr. J. J. Bailey; a third of $65 to Gordon Small, gardener to Mr. William H. Singerly, and a fourth of $50 to Mr. W. K. Harris. There were many other special money prizes, gold and silver medals and silver cups. The principal awards, besides those already named, were made to William Tricker, gardener to Judge Benedict, of Staten Island, William Dewar, P. Conlan and Gebhard Huster, gardener to Mrs. Heyl.

The attendance was unusually large, and altogether the exhibition can safely be described as the most successful of its kind in the history of this venerable society.

Chrysanthemums at Boston.

AT the exhibition of the Massachusetts Horticultural Society, which opened in Boston on Wednesday of last week, prizes were offered for Chrysanthemums alone, and yet both halls of the Society were well filled with plants and cut flowers. On the stage at the farther end of the large upper hall was displayed a collection of sixty plants from Edwin Fewkes, arranged in a sloping bank, the colors being admirably blended and contrasted. Along the entire length of the front of the stage was a bright terrace of cut flowers. In the centre of the hall were the various plants in competition for the prizes for specimens, while around the sides were the large groups in the twenty-plant class. Altogether, the scene presented to one looking down from the gallery was really brilliant. As a rule, the plants were not remarkable. They were fairly good, however, and were commendably free from artificial training and unnecesary staking and tying. One of the most remarkable plants in this hall was a seedling of an unusually deep orange color shown by Dr. Walcott, who also contributed flowers from other seedlings of conspicuous merit. Several of these were from seeds of Mrs. Wheeler, and one, a sport from Nil Desperandum, was a large, full, creamy white.

The cut specimen flowers surpassed, in size, variety and beauty, the best shown at any former exhibition. Two lots of twelve, contributed by Miss Simpkins, of Yarmouth, were superior in uniformity of excellence to anything in their class, and won both the first and second prizes.

Very striking were some of the novelties shown by Fewkes & Son, of Newton Highlands, especially those from the Japanese collection sent originally to Mrs. Alpheus Hardy, and including the famous variety named for her.

These flowers have attracted much attention in other exhibitions this year, and some of them rival the Mrs. Hardy in beauty, although not in novelty of form. A seedling from Mrs. Wheeler was shown by Mr. E. A. Wood, which is even richer in color than that admirable flower, and which has the additional advantage of being very double to the centre. Of the cut flowers in vases, mention should be made of some blooms of Cullingfordii and Jardin des Plantes. They were grown by Mr. C. J. Power, of South Framingham, and as displayed on long, strong stems, they showed a grace of form and richness of color which nothing short of the most intelligent cultivation could produce.

The principal prizes, except those already mentioned, were awarded to E. W. Wood, Mrs. F. B. Hayes, Joseph H. White, Mrs. E. M. Gill and P. Malloy.

A superb specimen of *Cypripedium insigne* was exhibited by W. H. Martin, gardener to Mr. N. T. Kidder, of Milton. The plant bore ninety flowers, and perhaps no finer one was ever grown.

Notes.

Hill & Company, of Richmond, Indiana, received the leading prize at the Chrysanthemum exhibition at Indianapolis.

Messrs. Pitcher & Manda, of Short Hills, New Jersey, have lately secured a white flowered variety of *Masdevallia Harryana*—the only plant of the kind known to exist.

The banquet at the opening of the Chrysanthemum exhibition in Philadelphia last week was pronounced a most enjoyable and successful one by the many visitors who were present at the hospitable invitation of the Florists' Club, of that city.

The Proceedings of the Annual Convention of American Cemetery Superintendents, held at Brooklyn in September last, have been published in a neat pamphlet. The papers read and the discussions which followed contain much interesting information and sound doctrine.

German horticultural papers note with surprise the number of the florists who attended the recent convention in New York, and with still more surprise the distances over which many of them traveled to be present, "some of them actually coming three thousand miles"! According to their witness it was the largest meeting of horticulturists that has ever been held in the world.

The trustees of the Massachusetts Society for Promoting Agriculture voted, at a recent meeting, upon the request of Mr. B. E. Fernow, to contribute $100 towards the cost of the exhibit to illustrate the forests and forest products of the United States at the Paris Exhibition of 1889, which the officers of the Forest Division of the Department of Agriculture are preparing.

We are apt to think that the cultivation and naming of numerous varieties of fruits is a comparatively modern practice. But how far from true is this belief may be shown by the fact that between the years 1598 and 1628 Le Lectier, Royal Procurator at Orleans and a famous pomologist, collected in his garden 262 varieties of Pears. In 1628 he printed a long catalogue of fruits, and caused it to be circulated with the request that cultivators would inform him with regard to all varieties as yet unknown to him.

According to the *Illustrirte Garten Zeitung*, of Vienna, no less than a hundred varieties of the Beech are known in gardens. The most recently introduced variety, called *Fagus sylvatica conglomerta Bandrilleri*, has twisted, almost rolled-up leaves, and a very short, dense spray. A favorite tree for street and formal planting in Germany is the so-called "Bullet Acacia," which has a tall, straight stem, surmounted by a dense spherical head; and the new Beech is recommended as a good substitute for this Acacia, as it can be grown to a similar shape without the use of shears, its leaves appear earlier in the season, and it often retains them throughout the winter.

Chrysanthemums of great beauty are sold this year in the streets of Boston in surprising numbers. A bunch of flowers, such as hardly existed in the United States five years ago, can be bought now for fifteen or twenty cents from the itinerant flower-sellers seen in all the most frequented parts of the city. The improvement of the Chrysanthemum and its growth in popularity is one of the most remarkable and encouraging signs of horticultural development in the United States. It is a question whether this flower does not have a stronger hold upon popular favor in this country than even the Rose. But if this is true, it is only temporary. The Rose has held its own for centuries. New favorites come and go, but in the long run the Queen of Flowers maintains her supremacy in all lands and among all people, and she will continue to do so.

Of Winter Apples for market in New England, the Baldwin, Rhode Island Greening and Hubbardston continue to hold supremacy, and last winter the Rhode Island Greening, for some unknown cause, kept better than the Baldwin. Professor Maynard reports, in a late bulletin of the Massachusetts College Station, that the Pewaukee, a seedling of the Oldenburg, possesses all the vigor and productiveness of its parent. The fruit is of good size, striped and splashed with red and covered with a deep bloom. It is a late keeper, of fair quality and has borne heavily every year in the college orchard. Sutton Beauty, owing to its fine flavor, its beauty and its productiveness, is slowly finding its way into orchards. Its medium size injures it in competition with so popular a variety as the Baldwin. The Red Russet, too, is gaining favor for the vigor and productiveness of the tree and the beauty and long-keeping quality of the fruit. The tree is as sturdy as the Baldwin and the fruit keeps as long as the Roxbury Russet.

Some exhibitors of Chrysanthemums endeavor to keep the blooms fresh for six or eight days, but to have them in the best condition on a given date they should not be cut earlier than four days before that date. Mr. E. Molyneux states in *The Garden*, London, that varieties of the darkest shades of color—chestnut, bronze, deep lilac and rose—lose their freshness more quickly than the lighter colored varieties, while primrose, yellow and white keep fresh the longest. The beginning of decay can best be ascertained by feeling the lower florets. These should be crisp and solid, not soft and flabby. The blossoms should be cut when fully developed and with a stem at least twelve inches long, so that a small portion of it can be cut off every day. Place the stem in a bottle of water to which salt has been added in the proportion of a teaspoonful of salt to a quart of water. The flowers should be placed in a cool, slightly darkened room having a dry atmosphere.

The Pomological Institute of Reutlingen, Germany, consists of two branches, a preparatory and a high school. The programme of studies to be pursued in the high school during the coming winter half-year has just been issued, and is of interest as showing how systematically and thoroughly horticulturists are trained in the Fatherland. Botany, with the morphology and anatomy of plants; pomology, drawing—each of these is to be studied during four hours each week. Two hours each are to be devoted to vegetable gardening, the theory of horticulture, geognosy and geology, chemistry, the care of woodlands, arithmetic, and the conduct of business. One hour a week is given to the means of preserving fruit from insect depredations, and the remaining time will be filled by practical work, experimental demonstrations and practice with the microscope. As aids to oral instruction the institute is supplied with model gardens, nurseries, orchards and plantations of small fruits, an arboretum, a forcing-house for fruit, green-houses of other sorts, a rich natural history collection, a large library, and maps, pictures, apparatus and models of every kind.

In spite of the fact that unexpected early frosts somewhat injured the Cranberry crop of southern Massachusetts, it is expected to reach greater proportions than ever before. The largest annual shipments are made from the town of Wareham, at the head of Buzzard's Bay, where nearly 18,000 barrels were packed last year. One bog in this vicinity covers 500 acres. Prices vary much, according to the season, but it is estimated that in a good year a cultivator who understands growing, harvesting and packing his berries may count half his receipts as clear profit. Wisconsin and New Jersey also grow Cranberries in large quantities, the former state sometimes producing double the yield of Massachusetts. But owing to the difficulty of protecting the western bogs against frost their yield is very uncertain, having varied during the past few years from as few as 13,000 to as many as 132,000 barrels. In Massachusetts, where innumerable brooks and rivers traverse the Cranberry districts, the bogs are surrounded by a system of ditches and dams so that they can be quickly flooded to a depth of several inches, and the berries thus protected against frost. The quality of the so-called Cape Cod Cranberry is also considered better than that of the western fruit, and has been largely exported even further west than Chicago. The harvest is usually completed about Thanksgiving-time.

A horticultural firm in Holland recently received from its agents in Java a specimen of the gigantic Orchid, *Grammatophyllum speciosum, Bl.* Accompanying it was a description of a plant growing in the botanical garden at Buitenzorg, in Java, which we quote from the pages of the *Gartenflora*. "This plant now displays twenty-eight flower-spikes, which average eight feet in length, and some of which bear as many as seventy blossoms, about fifty blooming at once. The flowers measure six inches across, and each petal is three inches in length by one and one-half in breadth. The color of the sepals and petals is yellow with brown spots, while the comparatively small lip is purple streaked with brown. The stout flower-stalks stand mostly erect, as do the heavy pseudo-bulbs, some of which are as much as ten feet in length. As is the case with most Orchids, the flowers remain a long time fresh. The plant is a native of the forests of western Java and of some of the other islands of the Indian Ocean, although it is nowhere very common." *Grammatophyllum speciosum* was introduced into Europe by the Loddiges, and flowered in their nurseries during the year 1852. There is a figure of the rather imperfect flowers of this specimen in Paxton's *Flower Garden, t.* 69, and there is a much better figure in the *Botanical Magazine, t.* 5157, from a plant which flowered in England in 1859.